Papers and Originals

A Fifth Freedom?*

Sir DUGALD BAIRD,† M.D., F.R.C.O.G.

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You will recollect that Franklin Roosevelt in a speech on 6 January 1941 said:

"In the future days, which we seek to make secure, we look forward to a world founded upon four essential freedoms.

"The first is freedom of speech and expression.

"The second is freedom of every person to worship God in his own way.

"The third is freedom from want.

"The fourth is freedom from fear."

And I would suggest that it is time to consider a fifth freedom —freedom from the tyranny of excessive fertility.

I propose to consider this problem first from the point of view of world population and secondly from the point of view of the individual man and woman.

World Population Problem

Whereas high fertility was a necessary safeguard for man's survival in primitive societies, where deaths at all ages were high and the expectation of life was short, this no longer obtains in advanced societies, where death rates are so low that an average of 2.3 children per family has sufficed to ensure replacement of the population. The great advances in science and technology in the highly developed countries have now been applied to certain of the underdeveloped countries with such success that death rates are falling rapidly, while the high fertility pattern, formerly necessary in these societies for survival, still obtains and the world is faced with a fantastic increase in population, which, if unchecked, may indeed threaten the survival of mankind.

It has been estimated that the world population was possibly about 30–50 million before the discovery of agriculture, by the mid-seventeenth century it was 650 million, by the beginning of the nineteenth century 1,000 million, and by 1950 about 2,000 million. The average *rate* of increase per annum in each period has been 0.1, 1.0, and 1.5% respectively. I shall give a few examples of what is happening to-day in different types of society.

Mauritius.—An example of the catastrophic effect of modern chemotherapy on a population can be seen in Mauritius (Burnet, 1961), where an intensive campaign to eliminate malaria by the use of D.D.T. and other modern techniques was so successful in 1946–8 that infant mortality fell from about 150 to 50/1,000 in 10 years. The general death rate fell from 28 to 10/1,000 and the population rose by 40%.

India.—In India, though Nehru (*Times*, 11 December 1963) and his Government recognized the dangers of population increase and supported a policy of birth control, in practice in the second five-year plan for India only $10 million was allocated for population control as against $14 million for malaria control, a measure which, by lowering death rates quickly, could further aggravate the population crisis and reduce the standard of living, in that more capital, skills, and experience are absorbed in looking after children and young people and less is available for industrial development. The population of India is increasing by about 8 million a year (2%), and it has been calculated that unless the birth rate is halved in the next 25 years the prospect of economic betterment may disappear entirely.

Pakistan.—So many more of the children in Pakistan are surviving and growing to maturity that even if they in due course have smaller families the total population will continue to rise. Fig. 1 shows the bulge in the population of Pakistan

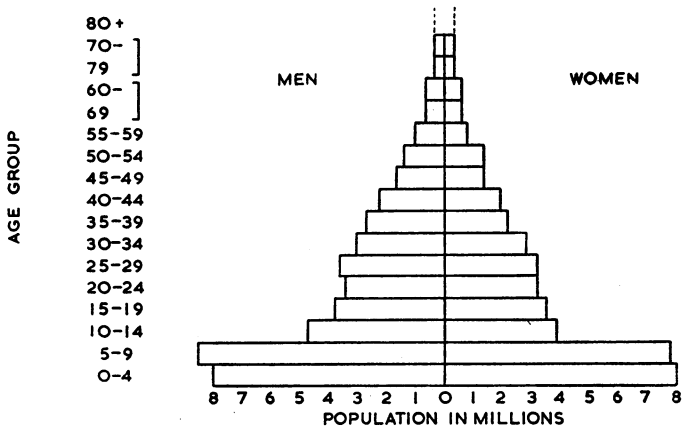

FIG. 1.—Age-pyramid, Pakistan, 1961 (*U.N. Demographic Yearbook*, 1963). Quoted from Florence, P. S., *Eugen. Rev.*, 1964, **56**, 143.

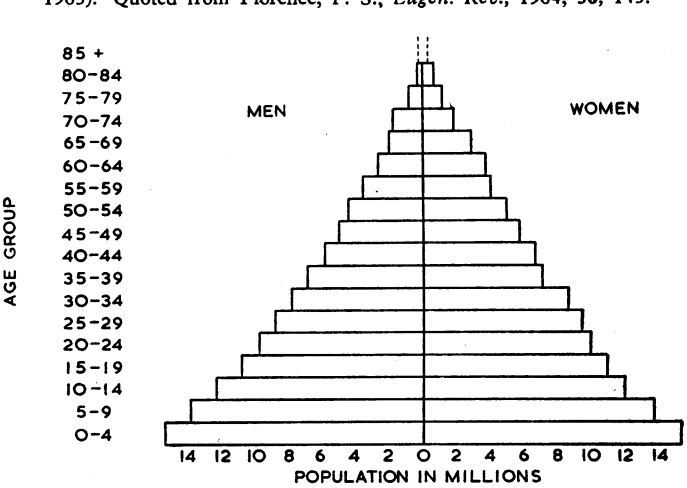

FIG. 2.—Age-pyramid, England and Wales, 1871 (Mitchell: *Abstract of British Historical Statistics*). Quoted from Florence, P. S., *Eugen. Rev.*, 1964, **56**, 144.

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† Regius Professor of Obstetrics and Gynaecology, University of Aberdeen.

under the age of 10. The shape of the pyramid is quite different from that of England and Wales in 1871 (Fig. 2), when birth rates were at their peak. Those who say that there is no need to take emergency measures to cut down birth rates in such countries as Pakistan and India and think that things will right themselves as they did in Europe should note that it took fully 100 years of industrialization and education to reduce the English birth rate at all.

Africa.—In some of the more primitive societies in Africa still unaffected by modern medicine there is no problem of overpopulation, and high birth rates are necessary for replacement, since death rates are high. In some parts of Africa, for example, 50% of children born alive are dead by the age of 5.

It was a hard struggle for primitive societies to survive and flourish, and traditions and customs were developed which ensured that women bore virtually the maximum number of children that was physiologically possible, and the death of one child was followed immediately by the conception of the next. High fertility and a strong instinctive love of children were therefore essential.

Policy of Aid by Advanced Countries

We need a more positive policy of aid to these countries. The advanced nations must do everything they can to help Governments of countries with a low standard of living and high birth rates to solve their problem. The present crisis is that quantity threatens quality, the present threatens the future. The Americans have largely sponsored the International Planned Parenthood Movement and have given both money and expert help on a very generous scale: but voluntary effort is not enough in large countries like India, especially when the additional factors of extreme poverty and the passive attitude of most of the people are considered. Attempts to persuade United Nations to give help have failed up to now. When the question was raised by Sweden and Denmark at the United Nations Assembly in 1962 the opposition succeeded in removing from the resolution a clause empowering the United Nations to give technical help on methods of population control to Governments requesting it.

However, in May 1965 the World Health Assembly agreed to recommend that such help should be given to Governments requesting it. The British Government has more recently supported the application of the International Planned Parenthood Federation to be recognized by the United Nations as a non-governmental organization.

To the outsider, at least, it seems that one of the main reasons why the World Health Organization has done virtually nothing about population control is that Roman Catholics claim a right to regulate the conduct of others besides themselves.

Problem in Industrialized Societies

Japan.—The most dramatic and effective attack on overpopulation has just been completed in Japan, a highly industrialized society, short of living-space. After the second world war the position was desperate for the Japanese. The birth rate was high, their land space small, and their Empire suddenly gone. The birth rate fell from 34 to 18/1,000 between 1948 and 1959. This was achieved under a "eugenic protection law" which legalized abortion and family planning. About 50% of pregnancies ended in abortion. This was the only way in which the birth rate could be brought down quickly in the circumstances. Now there is more reliance on birth-control methods, which are being taught in 800 health centres by 50,000 visiting nurses and midwives who have received special training in the methods in use. Nevertheless the population will rise to over 100 million by 1990.

U.S.A.—The U.S.A., the most advanced technological society in the world, faces a doubling of its population in the next 30 years. The death rate is so low that with an average family size of only 3.0 the annual increase in population is 2%, as high as any in the world—in 1960 the population was 180 million, the estimate for 1980 is 249 million, and by the year 2000 it may possibly reach 344 million. The problem here, of course, is of a different type from that of the underdeveloped countries in that the standard of living is so high that it is making great demands on the world's available resources and on the ability of the community to mobilize sufficient social services, such as education and medical care.

Britain.—A rapid population increase has been going on in Britain since the eighteenth century, though during the industrial depression of the 1930s the birth rate fell to below replacement. This, however, proved to be only a temporary phenomenon, and since the 1939–45 war the birth rate has risen. The increase in the number of babies born per annum has been striking since 1958. The most important factors underlying the increase are a much higher marriage rate, especially in the younger age-groups, and a slight increase in the average family size. The Registrar-General (1964) forecasts that the number of births in England and Wales will increase from 863,000 in 1963–4 to 1,147,000 in the year 2000, and that the total population will increase by about 370,000 a year in the next 20 years (0.7% per annum) and after that possibly at a faster rate till the end of the century. The total population is forecast at 65 million in 2003—an increase of 18 million over 40 years. It must be remembered, however, that long-term demographic forecasts can be unreliable.

Problem for the Individual

Let us now consider the problem of excessive fertility from the point of view of the individual. In 1963 Huxley wrote:

"The knowledge explosion of the last 100 years since Darwin is giving us a new vision of our human destiny—of the world of man, and of man's place and role in the world. . . . Man is not merely the latest dominant type produced by evolution, but its sole active agent on earth. His destiny is to be responsible for the whole future of the evolutionary process on this planet. Whatever he does he will affect that process. His duty is to try to understand it and the mechanism of its working and at the same time direct and steer it in the right direction and along the best possible course."

"The progress in medical science, besides accomplishing control of disease, must also improve the quality of life by providing greater fulfilment for more human beings and fuller realization of their individual possibilities and social achievements in such a way as not to hamper the attainment of greater fulfilment by generations to come."

In Britain, replacement of the population requires an average of only 2.3 children per family. Most young people seem to plan their families carefully with a view to giving the children "the best chance in life," and three seems to be about the number most of them feel they can cope with. Since most women marry under the age of 25 and are capable of producing three times this number it is clear that control of conception is the rule for almost everyone. Until recently the methods available were unreliable even when used with care and put a considerable nervous strain on the couple concerned. Not unexpectedly there are great social class differences in methods employed and in the efficiency with which they are used. For example, in the United Kingdom the percentage of women having a fifth or subsequent child varies from 3 in social classes I and II (professional and managerial classes) to 14 in social classes IV and V (the semi-skilled and unskilled manual classes). Again the percentage varies from 7 in the South-east of England to 12 in the North. These regional differences are related to the fact that women in London and the Home Counties are more sophisticated than in the industrial North. In addition, there is considerable migration from the North to

the South of more intelligent and enterprising men and women who are attracted by higher standards of living and who tend to limit the size of their families.

Table I, from the report of the Family Planning Association Working Party (1963), shows that in "birth-control-minded" couples withdrawal remains the most preferred procedure in the lowest social classes but loses popularity progressively at higher social levels. The steepest gradient, sloping the other way, is in the use of the cap, and there is a similar but less steep social gradient in the use of the sheath. In the highest class one couple in four have at least tried the cap, in the intermediate class 1 in 10, and in the lower only 1 in 66.

TABLE I.—*Birth Control Procedures Ever Tried by All Users Starting Birth Control on Marriage in Different Social Classes.*

	Couples Married 1950–60		
	Non-manual	Skilled Manual	Other Manual
% of couples starting birth control on marriage	59·0	43·0	31·5
% of such couples who tried :			
1. Sheath only	39·0	33·5	29·5
2. Withdrawal only	12·0	30·5	38·5
3. Combination of 1 and 2 ..	10·0	16·0	16·0
4. Cap only	23·0	10·5	1·5
5. Others	16·0	9·5	14·5
	100·0	100·0	100·0

Although progress in family planning is encouraging, the authors of this report feel that there is still point in the judgments passed by the Royal Commission on Population in 1949.

"At present, though the practice of contraception is widespread, public knowledge of effective methods is very uneven, and faulty knowledge causes a formidable amount of harm. This is reflected most obviously in the prevalence of criminal abortion. No precise estimates of the prevalence of criminal abortion are available, but all authorities are agreed that it is sufficiently widespread to constitute a grave social evil. . . . Abortion is a form of family limitation resorted to, for the most part, because of failure, through ignorance or other cause, to prevent conception. The use of relatively unreliable methods of contraception (for example, coitus interruptus) is the cause of other distress that does not find expression in this extreme form ; the harm arises not only from the failures but also from the fear of failure ; and the evidence submitted to us suggests that much marital disharmony can be traced to the anxiety that accompanies the practice of coitus interruptus. Finally, faulty knowledge or practice of contraception contributes to some of the harmful consequences of the differential birth rate, among them the social and other problems that arise from the large numbers of children who are born to men and women, who, through defects of intellect or character, are unable to care properly for them."

With the most careful use of the mechanical methods, the sheath and the cap, failures do occur, and there is therefore always some degree of apprehension attached to their use which may disturb harmonious marital relations. It is little wonder that couples who have achieved the desired number of children are daunted by the prospect of possibly twenty years of a regime which, in addition to being unreliable, involves preparation for the sexual act and consequent loss of spontaneity.

The advent of the contraceptive pill is a great advance and will be a revolution if in the light of experience it can be shown to be free of harmful effects. Fox (1965) (the Director of the Family Planning Association) said: "We [the Association] are, or should be, concerned not only with the people who want help but also with the much larger number who need it. . . . The time has come to persuade our professions, the public and the Government that aid over the physical and mental side of marriage is a necessary part of preventive medicine which ought to be given under the National Health Service."

I shall describe how we have attempted to help the women of Aberdeen to solve the problem of family planning.

Family Planning Clinics

Before the second world war the "Constructive Birth Control Clinic," run on a voluntary basis by Mrs. Fenella Paton, was for practical purposes the only source of advice on the subject in Aberdeen. In 1946 the local health authority assumed responsibility for this work and incorporated it into their maternity and child welfare service.

On the basis of the number of marriages in Aberdeen annually it is possible to assess that about 30% of married women in Aberdeen have visited the local authority clinic at least once to obtain advice on family planning. The social-class distribution of the patients attending is fairly representative of married women in Aberdeen as a whole. Previous to 1964 the vaginal diaphragm and other mechanical methods only were advised, and were used in about 97% of cases. However, in May 1964 the oral pill was introduced, and in the ten months till the end of March 1965 the total number of patients increased sharply: 52% of all first attenders elected to use oral contraception. The percentage varied from 30 in social classes I and II to 70 in classes IV and V.

The fact that the increase in numbers was least in upper-social-class women may be due to the fact that they prefer to obtain supplies of the pill through their family doctors. Again, some may hesitate to use the pill because they are aware that it acts by interfering with normal ovarian and pituitary function. Others, too, are alarmed by press reports of complications following its use. Upper-social-class women usually discuss the problem of contraception freely with their husbands and find some more or less satisfactory solution. Nevertheless, as already stated, the psychological and aesthetic disadvantages of the standard mechanical methods plus the fear engendered by the fact that they are not altogether safe interfere seriously with the sex life of both husband and wife. The advantages of the oral method aesthetically plus its greater effectiveness in preventing pregnancy will eventually secure its adoption by most upper-social-class women if its freedom from long-term toxic effects can be assured.

Women in the semi-skilled and unskilled occupational groups have adopted the oral method with much less hesitation. This is not surprising, since they now have, for the first time, effective control of conception *themselves* by a method which they can apply easily. There is seldom much discussion of the subject of family planning between husband and wife. Sometimes the husband is quite uncooperative or irresponsible. Many lower-social-class-women who are fitted with a vaginal diaphragm abandon its use, after only a short trial, for a variety of reasons, such as "it was painful," "husband did not like it," "too difficult to insert," "no privacy or bathroom facilities." However, some women take no effective precautions, and, when asked why, can give no explanation or may say, "We were going to do something about it but never got around to it." Some express fatalistic opinions such as "I suppose I'll have my number." Thus apathy and ignorance on the subject of family planning are still prevalent in the lower social classes, though the percentage to which this applies is getting less.

Fig. 3 shows that in Aberdeen the percentage of prenuptial conceptions rises steadily from 4 in social class I to nearly 40 in social class V. Table II shows that after five years of marriage families are largest where the first pregnancy precedes marriage and grow steadily smaller with lengthening of the interval between marriage and conception. Table III shows that families are largest when the mother is under 20 years of age at the time of the first birth and decrease steadily with increasing age of the mother at marriage.

Table IV shows the methods of contraception in use in the various social classes in Aberdeen five years after marriage. It will be noted that in social classes IV and V coitus interruptus was practised in 34% and in 23% of cases no precautions were taken. It is clear that prenuptial conception, early marriage, low social class, and poor contraceptive technique are

characteristics of those with large families. Baird (1946) and Glass and Grebenik (1954) also found that women in the lower social classes, especially those who conceived premaritally, tended to have large families.

Baird and Scott (1953) found that a low-intelligence-test score was associated with a high failure rate with every method of contraception used. One-third of the women in classes IV and V had poor or very poor intelligence-test scores. There was a correlation between short stature, poor physique and health, poor living conditions, and large family of origin. Tall women had higher intelligence-test scores than short women in both the skilled and the unskilled manual groups. Generally speaking, the more intelligent parents in the lower social classes have fewer children, who in turn grow up to be taller than average and tend to rise in the social scale on marriage (Illsley, 1955).

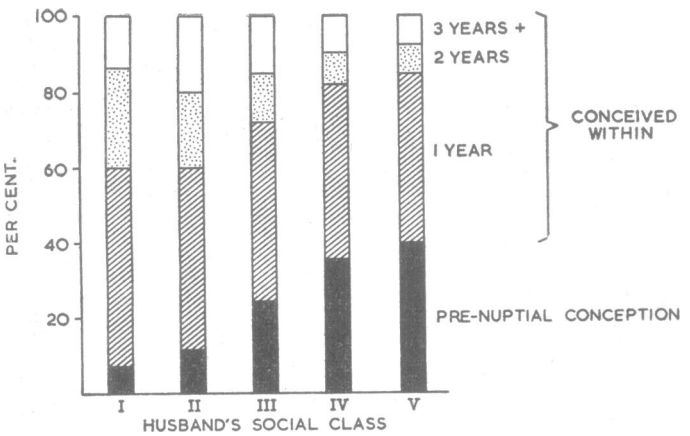

FIG. 3.—Interval between marriage and conception, Aberdeen married primiparae (3,154 cases).

TABLE II.—*Family Size After 5 Years of Marriage by Interval Between Conception and Marriage. All Aberdeen Primigravidae* 1949

Marriage–Conception Interval	No. of Maternities 1	2	3	4+	Total
	Percentage				
Conceived before marriage:					
Over 16 weeks	27	42	20	11	100 (132)
5–15 „	30	47	17	6	100 (104)
Conceived after marriage:					
Less than 11 weeks ..	35	50	14	1	100 (164)
12–52 weeks	39	46	12	3	100 (185)
1–2 years	46	47	7	—	100 (95)
2–3 „	65	24	8	3	100 (37)
3+ „	70	29	1	—	100 (80)
All intervals	40	44	12	4	100 (797)

TABLE III.—*Maternal Age at Marriage Related to Family Size 5 Years Later. All Aberdeen Primigravidae* 1949

Age at 1st Delivery	No. of Maternities 1	2	3	4+	Total
	Percentage				
16–19	22	48	20	10	100 (116)
20–24	39	45	13	3	100 (387)
25–29	38	50	10	2	100 (197)
30–34	64	29	7	—	100 (72)
35+	92	8	—	—	100 (25)
All ages	40	44	12	4	100 (797)

TABLE IV.—*Birth Control Methods Used After 5 Years of Marriage by Social Class in a Sample of Aberdeen Married Women*

Husband's Occupation		Method Sheath	Diaphragm	Chemicals	Coitus Interruptus	Safe Period	Nil	All
Non-manual (50)	%	32	32	2	22	2	10	100
Journeyman (77)	%	38	21	3	20	1	17	100
Other Manual (118)	%	24	12	7	34	—	23	100
All	%	30	19	4	28	1	18	100
Numbers		73	46	11	68	2	45	245

Fairweather and Illsley (1960) have shown that a high proportion of the mentally handicapped children who attend a special school in Aberdeen come from families which are characterized by very high frequency of marital and occupational instability, poor social conditions, high fertility, poor physique and health, and low average intelligence of the mother. Not infrequently other members of the family circle have attended the special school for the mentally handicapped.

About one-third of all the women in social classes IV and V, slightly less than 10% of all mothers, seem incapable of regulating the size of their families, and it is clear that family planning clinics fail to reach them. How, therefore, can we help this group who are most in need of it ? In this respect the work of Peberdy (1965) in Newcastle is of interest. By home-visiting of problem families to give contraceptive advice she was able to reduce the pregnancy rate from 130 to 23 per 100 woman-years. Voluntary sterilization and hysterectomy played a part. The oral method of contraception was by far the most popular. Morgan (1965) has had success in a similar service in Southampton.

Post-partum Tubal Ligation and Therapeutic Abortion

Tubal Ligation

As a contribution to the solution of the problem it has for many years been the policy in Aberdeen to perform tubal ligation in those women who have failed to prevent pregnancy and who find their health being undermined by worry, malnutrition, or overwork. In the late 1930s we began to offer tubal ligation to women between the ages of 35 and 40, who might have had as many as eight or more children. At first there was reluctance to accept the offer, and great ignorance was displayed of the nature of the operation and its effects. There seemed to be doubt whether menstruation would continue and apprehension whether or not coitus would be possible afterwards. The opinion was widespread that it was effective for only seven years. Nevertheless the demand for the operation has increased steadily, and now requests are received from women under 30 who have had four children or even fewer. By no means all of these come from the lowest socio-economic group.

Table V shows that in the City of Aberdeen in the years 1961–3 the incidence of post-partum tubal ligation was 4.5%.

TABLE V.—*Incidence of Post-partum Tubal Ligation. All Aberdeen City Legitimate Births, including Twins, 1961–3, by Age and Parity*

Parity	Age <25	25–29	30–34	35+	All Ages
1	0·05	0·0	0·0	0·0	0·0
2	0·3	1·1	0·5	9·0	1·1
3	1·1	2·3	2·6	5·0	2·4
4	8·3	13·0	9·1	10·1	10·6
5+	23·0	36·6	27·3	24·7	28·7
Total	34/3,830 (0·9%)	159/2.952 (5·4%)	115/1,593 (7·2%)	105/834 (12·6%)	413/9,209 (4·5%)

The rate rose rapidly with increasing parity, especially after the fifth birth, when it reached 28.7% The rate was low till after the second birth, except in women of 35 years or more, where it was 9%, the main indication being repeated caesarean section. In the younger women the indications were serious medical conditions in the mother. After a fourth birth the indication was debility aggravated by multiparity in 60% of cases.

After the fifth or subsequent birth the primary indication was debility and multiparity in nearly 90% of cases. Such women were often anaemic and suffered from chronic bronchitis. While in many no specific "disease" could be found, the women were chronically tired or depressed, they looked much older than their years, and had great difficulty in coping with their heavy household responsibilities.

It has already been pointed out (Table IV) that 57% of the women in the lowest social classes either make no attempt to prevent pregnancy or at most practise coitus interruptus. Even when such women do seek advice about family planning and are instructed in the use of an effective method they tend to become discouraged and give up.

Therapeutic Abortion

Despite the use of contraceptives, unwanted pregnancies do still occur because many people are careless and irresponsible in their sex lives. In most cases the pregnancy is accepted without too much distress and the child welcomed into the family circle in due course. In a few cases, however, we have been prepared to terminate pregnancy when it seemed in the opinion of the family doctor, the obstetrician, and a psychiatrist or general physician, as the case may be, that the mother's physical or mental health might be seriously harmed if the pregnancy continued. In arriving at our conclusions many factors may be taken into account, such as the personality of the mother, the relations between husband and wife, the number of previous pregnancies and their outcome, the mother's physical health and emotional state, living conditions, prolonged and serious illnesses in other children entailing added work for the mother, and the effect of fear of giving birth to a defective child on the health of the mother. Discussions take place with the family doctor and the health visitor, and reports of home visits by hospital social workers are studied. In a city where all patients are referred to clinicians working in a unified and integrated obstetrical and gynaecological service broad lines of policy can be agreed upon. The same organization and team-work exists in the department of mental health. Difficult problems can be discussed more formally at the weekly staff meetings. There is a large measure of agreement among the Aberdeen consultants on the present policy of both tubal ligation and termination of pregnancy, and it has the strong backing of the family doctors.

The nature of the problem varies somewhat with the social status and education of the patient. Upper-social-class women are on the whole in better health physically than those in the other social classes, so that termination for established medical disease is less common than in the lower social classes. On the other hand, termination for pychiatric reasons is more common. Some professional women carry a very heavy burden in running their house at a high level of efficiency, while at the same time doing a professional job and trying to be available for their children when needed. Working at this pitch they are vulnerable to an extra strain at times of illness and family crises, or if an unplanned pregnancy occurs. The risk may vary from one of serious breakdown in mental health, if the previous mental history is bad, to severe emotional stress, which may be more than the patient should be asked to bear. In these circumstances hysterotomy with tubal ligation is usually indicated, especially if the patient is in the middle 30s and she and her husband are quite sure that they do not wish to have more children.

The same type of problem can, of course, occur in the lowest socio-economic group. However, usually the emphasis is rather different. In the first place, women in the lowest socio-economic groups are less accustomed to long-term planning. They leave school at the age of 15, take a post which requires very little skill or training, marry early, often after pregnancy has occurred, and have little or no financial resources. They usually start by renting a room, often from relatives, and by the time three or four children have arrived in quick succession they may find themselves in a local-authority house, but possibly unable to cope physically and financially with the situation. Some ask to have the pregnancy terminated, but more often they agree to continue with it so long as they have the promise of an operation for tubal ligation in the puerperium. The assurance that the current pregnancy will be the last makes it possible for many to accept the situation.

The three methods most commonly employed to terminate pregnancy are: (*a*) abdominal hysterotomy with tubal ligation, (*b*) abdominal hysterotomy without tubal ligation, and (*c*) curettage.

During the three years 1961–3 the following operations to terminate pregnancy were performed on women resident in the City of Aberdeen:

Married women	(*a*) Hysterotomy and tubal ligation	137	cases
	(*b*) Hysterotomy without tubal ligation	3	„
	(*c*) Curettage	39	„
Single women	Hysterotomy without tubal ligation	8	„
	Curettage	16	„
	Total	203	

Married Women

Hysterotomy and Tubal Ligation.—In many cases the indications are multiple, but an attempt has been made to divide them into five cause groups (Table VI).

TABLE VI.—*Indications for Hysterectomy and Tubal Ligation by Parity. Aberdeen Women* 1961–3

Parity	Medical		Psychiatric		Psychiatric and Social		Debility and Multi-parity		Others		All Causes	
	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
0		2									100	2
1	66	4	33	2							100	6
2	34	9	46	12	15	4			4	1	100	26
3	34	11	25	8	31	10	3	1	7	2	100	32
4	28	13	23	11	38	18	4	2	7	3	100	47
5+	13	3	4	1	33	8	50	12			100	24
	29	42	25	34	29	40	11	15	5	6		137

Group M consists of those who have serious disease which makes further child-bearing dangerous to life or health.

Group P contains those women who were seriously disturbed psychiatrically, many of whom had attended a psychiatric hospital at intervals for years.

Group P+S contains those patients who showed severe emotional upset and in addition had a very disturbed domestic or other situation to cope with and one which could be regarded as a serious stress in a stable woman even when not pregnant. A few had had treatment previously by a psychiatrist.

Group D+M contains those women who showed extreme debility, usually associated with excessive child-bearing. They did not suffer from one of the recognized categories of disease, as did those grouped under "medical," but they were far from well, were usually anaemic and lethargic, and looked much older than their years.

Table VI shows that in women who have had two viable children previously about one-third of terminations were done for medical diseases in the mother. It also shows that the percentage in this category falls with increasing parity. One-

half of the terminations were for psychiatric reasons, the percentage decreasing with increasing parity thereafter.

Psychiatric+social or environmental factors were least important in the para-2 group, but increased in importance with increasing parity till after the fourth child. Debility was the most common indication in the para-5+ group (50%).

Table VII shows that the incidence of termination was highest in women who had had four viable children, particularly those who were 30 years of age or more. Women in this parity group constitute 12% of the child-bearing population, but 35% of the women who have had hysterotomy and tubal ligation. For all four indications the incidence of termination is greater than in any other parity group, the most important single indication being anxiety or depression and adverse social and environmental circumstances. In one case there may be many factors, such as deteriorating health, hypertension, adiposity, varicose veins, incompatibility between husband and wife, and serious financial difficulties. Overcrowding and the care of ageing parents may become difficult problems about this time. Forty per cent. of the women in this parity group belong to social classes IV and V and therefore do not have the educational and financial resources to cope adequately with such problems.

TABLE VII.—*Hysterotomy and Tubal Ligation in Aberdeen Women During the Period 1961–3 Calculated as a Percentage of the Births in the Same Age and Parity Groups During These Years*

Parity	Age						All Ages	
	<30		30–34		35+			
0	—	1	—	—	—	1	—	2
1	2,655	8 (0·08%)	190	0 (0%)	71	4 (5·6%)	2,916	6 (0·2%)
2	2,207	11 (0·5%)	418	5 (1·2%)	133	10 (7·5%)	2,758	26 (0·9%)
3	1,125	11 (1·0%)	429	8 (1·8%)	201	13 (6·5%)	1,755	32 (1·8%)
4	511	16 (3·0%)	274	20 (7·3%)	158	11 (7·0%)	943	47 (5·0%)
5+	284	4 (1·4%)	282	9 (3·1%)	271	11 (4·0%)	837	24 (2·8%)
All parities	6,782	44 (0·7%)	1,593	42 (2·6%)	834	49 (5·8%)	9,209	137 (1·4%)

Hysterotomy Without Tubal Ligation.—This operation was performed only three times, the indications being psychiatric. The small number illustrates that as a rule in married women with other children, if the condition is serious enough to warrant laparotomy and hysterotomy, tubal ligation is also indicated.

Curettage.—This procedure was used to relieve an acute temporary situation in relatively young women of low parity. For example, 50% had had fewer than three full-time pregnancies, compared with 25% in those where hysterotomy and tubal ligation was performed. The most common indication for termination was a severe psychiatric disturbance (45%), while emotional distress plus very unfavourable social circumstances came second (25%).

Single Women

There were 24 in this group: the pregnancy was terminated by curettage in 16 and by hysterotomy in 8, the method employed being determined by the duration of the pregnancy.

Nineteen out of the 24 were under 25 years of age, five of them being under 20 (three were schoolgirls of 16 years). The indication in seven was medical; in 14, psychiatric (usually severe depression); and in three, psychiatric plus environmental factors.

Table VIII summarizes the contrast in social distribution in relation to the various types of operation performed. Unmarried women who had a pregnancy terminated came from the professional groups (secretary, nurse, teacher) in more than 50% of cases, and all were under the age of 25. One-third of the married women who had a curettage performed come from social classes I and II and tended to be young. Married women who had the operation of hysterotomy and tubal ligation performed showed the same social-class distribution as the population of the city. Many were over 35 years of age. Post-partum tubal ligation was performed most commonly in women from the lowest social classes who have had four or more children.

TABLE VIII.—*Social-class Distribution by Type of Operation Performed. Aberdeen City* 1961–3

Operation	Social Class				No. of Cases
	I & II	III	IV & V	N.S.	
	Percentage				
Curettage, or hysterotomy, unmarried	54	33	4	9	24
Curettage, married	33	39	20	8	39
Hysterotomy and tubal ligation	15	45	37	3	137
Post-partum tubal ligation	9	48	43	0	413
All Aberdeen	14	59	27	0	613

Hall (1965), as a result of a questionary sent to 65 obstetrical hospitals in the U.S.A., found great differences in the practice with regard to termination of pregnancy, tubal ligation, and contraceptive advice. He discusses in more detail the practice at the Sloane Hospital, New York. Here the incidence of therapeutic abortion in the years 1956–60 was 1 in 429 in ward and 1 in 111 in private patients. In the private patients the incidence of abortion for psychiatric reasons was ten times that in the ward patients. In the private patients the uterus was emptied by curettage in 71% of cases and hysterotomy and tubal ligation in only 14%. There was a much greater tendency to employ hysterotomy and tubal ligation in the ward patients. The incidence of post-partum sterilization was about 2.5% in both private and ward patients, but the parity of the ward patients was much higher and there was a much greater incidence of medical indications. Only a very small percentage of ward patients received advice at the hospital contraceptive clinic, while contraceptive advice was easily available to all private patients. Dr. Hall's conclusions are: "The obstetrician's obligation to provide abortion, sterilization and contraception is inadequately and inequitably met at the moment. The obstetricians of America must individually and collectively review these vital issues in an effort to establish a more uniformly humane birth control ethic."

Assessment of Results

Health of the Mother

In Aberdeen many of the women who have had *tubal ligation* have been kept under observation for years. The most obvious finding is the improvement in general family well-being, with a more congenial home atmosphere, better marital relations, and obvious improvement in the mental health of the women. Several husbands, seen separately, agreed that the atmosphere in the home had improved. The removal of the constant threat of pregnancy allowed the woman to be a better wife and mother.

In the case of *termination of pregnancy followed by tubal ligation* there may be a greater risk of psychological consequences. This is difficult to assess, and is being studied by the department of mental health. Of 354 women from the North-east of Scotland in whom termination of pregnancy plus tubal ligation was performed for a variety of causes at least five

years previously, 29 were subsequently referred by the family doctor to the regional psychiatric clinic for treatment.

In only four of these was there any question of a link between the operation and the subsequent referral. In one there was some emotional upset which seemed to be related to the fact that hysterectomy rather than hysterotomy and tubal ligation had been performed. (In a few cases where there is some other condition, such as excessive periods or fibromyomata, hysterectomy is preferred to hysterotomy.) In the other three the disturbance was trivial.

Out of 19 cases seen in 1960, where termination of pregnancy was refused on the advice of a psychiatrist, three subsequently attended the psychiatric clinic for treatment. We therefore have no evidence that termination of pregnancy had any serious psychiatric consequences.

One of the most comprehensive follow-up studies is that of Ekblad (1961) in Denmark, where tubal ligation and/or termination of pregnancy can be performed on eugenic and medical grounds because of disease, bodily defects, or weakness. Social grounds alone are not enough, but on the grounds of "weakness" there may be social as well as purely medical factors (exhausted mothers). Ekblad followed up 225 women who were sterilized during 1951 on psychiatric or eugenic grounds or because of "weakness"—85% of them had a pregnancy terminated in addition. He found that psychiatric and neurotic symptoms were no more common than one might expect in the population generally. In those who had been psychiatrically disturbed the results were very good. In general, Ekblad's experience agrees with our findings that the results of hysterotomy and tubal ligation are most satisfactory.

Perinatal Mortality

It is well recognized that the perinatal mortality is now highest in the para-4+ group. For example, in the National Birthday Trust Survey of 1958 the rate was 50 per 1,000. As has been stated earlier, the percentage of women having a fifth or subsequent maternity (viable child) increases from 7% in the South of England to 12% in the North. It is 16% in Glasgow and Clydeside. The fact that the Aberdeen percentage is slightly less than 7 is the result of our determination to help all mothers to have the number of children they desire and also because we have made a special effort to help those who are least able to look after themselves. In Aberdeen the para-4+ group contributed approximately 9% of all perinatal deaths and in Glasgow about 20%—a very substantial proportion of the high overall perinatal mortality in that city.

It is interesting to compare Aberdeen with the South Region of England. The para-4+ group contributes about 7% of all births in each area, but the overall perinatal mortality is about 10% less in Aberdeen than in the South Region. In women under the age of 30 the perinatal mortality is about 30% higher in Aberdeen than in the South of England, whereas over the age of 30 the Aberdeen rate is about 25% less than in the South. The explanation of this striking age-effect is that under the age of 30 the much poorer standard of health and physique of the Aberdeen women results in higher death rates from prematurity, malformations, and ante-partum haemorrhage, which are difficult to prevent by obstetrical skill. Over the age of 30 three factors operate. In the first place, 30% of the Aberdeen women who have had four or more viable children had tubal ligation performed and those who continue child-bearing come from the remaining 70%, who are, on average, much healthier and have a better reproductive history. Secondly, a high percentage of these elderly multiparae are delivered in teaching hospitals in Aberdeen under specialist care, and for those booked for home delivery transfer to hospital can be achieved quickly and easily. Thirdly, the perinatal deaths which occur in the healthy elderly multiparae are due predominantly to placental insufficiency or to birth trauma related to malposition of the foetus ; many of these deaths can be prevented by good obstetrics.

Maternal Mortality

Thirty years ago excessive child-bearing was a very important cause of maternal mortality. In the Glasgow Royal Maternity Hospital between the years 1925 and 1934 more than 25% of the mothers who died had already had six or more children. In the years 1938–47 in Aberdeen two-thirds of the women in whom hysterotomy and tubal ligation was performed had had seven or more children ; by 1958 only 20% were in this category. In the years 1961–3 only 17% had had five or more previous children. This decline in the number of elderly women of high parity has been an important factor in the decline in maternal mortality.

Maternal mortality (Ministry of Health, 1963) is now very low, but the death rate in the age group 35–39 is still twice, and in the 40+ age-group four times, the national average. Similarly, in women having a fifth child the rate is twice, and in those having a sixth or subsequent child four times, the national average. The number of deaths following therapeutic abortion is very low. Goodhart (1964) has estimated that 104 deaths followed illegal abortion in the years 1958–60 in England and Wales. This would give a case mortality about equal to that of maternal mortality from all other causes if, as some have estimated, the number of such operations is as high as 100,000 annually.

The incidence of therapeutic abortion in Aberdeen is about 2% of all maternities, and there seems to be very little termination of pregnancy by unqualified persons, possibly because women know that their difficulties will receive sympathetic and unprejudiced consideration from the medical profession in Aberdeen. Certainly septic abortion is very rarely seen.

Conclusions

In the past as the standard of living rose the average number of children per family fell and these changes occurred gradually, keeping pace with rising standards of education. But recently in the underdeveloped countries the rapid control of infection by chemotherapy, without a corresponding increase in the standard of living and education, has led to very rapid increases in population, which make comprehensive policies of population control essential if economic development is not to be hindered. Even in countries with a high standard of living the population increase constitutes a threat to the quality of life.

The contraceptive pill is a great advance on any of the previous methods available, and if its freedom from long-term toxic effects can be assured should greatly decrease the need for the clumsy and unattractive mechanical methods now in use. Its simplicity and greater reliability should diminish anxiety and the need for tubal ligation. Nevertheless, for the woman who has finished with child-bearing by the age of 30 the prospect of taking pills for 15 to 20 years is not a very attractive one. In such cases tubal ligation has much to commend it, and it should be accepted by society as a right and proper alternative.

No matter which method is used, unplanned pregnancies will occur, and sometimes their continuance will seriously endanger the mother's health and her effectiveness as a mother. Such cases should be carefully assessed and pregnancy terminated when the weight of evidence strongly points to the advantages of this step.

One might ask who is to be considered in these matters. Are good parents doing their best for their children to have their plans upset by having no escape from the accident of an unwanted pregnancy ? Is it fair to bring a child into a patho-

logically disturbed environment ? In a world where there are too many children should women be forced to endure this tyranny of unwanted pregnancies ? If the answer is no, we must plan accordingly.

In Britain this means making contraceptive advice freely available under the National Health Service and offering tubal ligation to women who have had the desired number of children. This would help to free women from the tyranny of unwanted pregnancies and also make them more independent and able to choose freely how they will use their training and skills, especially after their desired number of children have been born. The world outside the home needs the skill and productivity of trained workers, and women, as well as men, need the satisfaction of education to their maximum potential ability and the opportunity to exercise their skills in a wider sphere than the immediate family.

To quote Huxley again: "The progress of medical science, besides accomplishing control of disease, must also improve the quality of life by providing greater fulfilment for more human beings. Fulfilment in this sense involves physical, mental and spiritual well-being."

To achieve this the world needs a Fifth Freedom—freedom from the tyranny of civilized man's excessive fertility.

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Depot Injections in Treatment of Hay-fever and Pollen Asthma*

R. S. BRUCE PEARSON, D.M., F.R.C.P.

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The injection of pollen extracts in the form of mineral-oil emulsion was introduced by Loveless in 1947. Since then it has been extensively employed in the United States, particularly by Brown (1958, 1959, 1961), who has consistently claimed good results with few systemic reactions. Other American workers (Feinberg *et al.*, 1960 ; Arbesman and Reisman, 1964 ; Sobel, 1961, 1962 ; Mechaneck, 1963) have claimed less good results and a higher proportion of systemic reactions. Side-effects, including general reactions, sterile abscesses, and delayed skin reactions, are referred to in an editorial of the *Journal of Allergy* (1961). The obvious advantage for both patient and doctor is that injections of pollen emulsion are limited to one, two, or three, compared with 20–40 of the conventional aqueous injections. In each type of treatment the course of injections should be repeated annually for at least three years.

Preliminary reports from this country (Frankland, Macaulay, and Evans, 1963 ; Frankland, Macaulay, Evans, and Edwards, 1964) suggested that emulsion therapy in hay-fever and pollen-asthma sufferers warranted further trial. In Europe depot-emulsion therapy has been little used (Dal Bo, 1964). All the indications from published reports suggested that a large-scale combined trial should be carried out. This has now been undertaken in a number of centres, a commercially made grass-pollen emulsion being used. The investigation was made during 1963 and 1964. During the first year attention was paid mainly to the incidence and variety of side-effects, while in the second ear comparison was made between the effect of treatment with mulsions and aqueous extracts and also between three schemes dosage of emulsion therapy with a view to determining the imum safe dose. The objectives were therefore to determine whether the "depot" treatment was in the first place safe and in the second place effective.

* The following members of a subcommittee of the British Allergy Society took part in this trial: Dr. R. M. Boveri, Dr. R. G. Evans, Dr. A. W. Frankland, Dr. E. W. Jarratt, Dr. S. Z. Kalinowski, Dr. J. M. Kerr, Dr. D. B. Macaulay, Dr. Monica McAllen, Dr. R. S. Bruce Pearson (Chairman), Dr. J. Pepys, Dr. H. Royle, Dr. J. M. Sherriff, Dr. E. C. Tees

Selection of Patients.—All patients suffered from hay-fever or pollen asthma, or a combination of the two, as judged by the seasonal nature of their symptoms and the presence of positive skin reactions with grass-pollen extracts. Patients with perennial rhinorrhoea or asthma, even if they were sensitive to grass pollen, were excluded, but it is probable that some patients were sensitive in some degree to other air-borne seasonal allergens, such as tree pollens, or certain mould spores.

Patients treated in 1963 had in the majority of cases been treated with aqueous pollen in previous years ; but in 1964, out of 379 patients given emulsion therapy 294 had received only palliative treatment with antihistamine or bronchodilator drugs in the past ; 85 had been desensitized with aqueous extracts in previous years. None had received previous "depot" theory.

Methods and Materials

The pollen emulsion was made with the mineral oil Drakeol, with Arlacel A as the emulsifying agent, in a ratio of 65:35. It was prepacked in a disposable syringe which contained inert emulsion separated by a flange from active emulsion containing the grass pollen. The preliminary injection was given during February, March, and early April, and in no case was the second or third injection given after the second week of May. Injections were given subcutaneously into the upper arm: the skin was drawn upwards before insertion of the needle ; the inactive "shield" (0.7 ml.) was first injected, then the needle was advanced 2–3 mm. so that the active material (0.3 ml.) contained in the second compartment of the syringe could be injected into the centre of the inert emulsion. After withdrawal of the needle the skin was allowed to return to its normal position, thus making a valve which prevented leakage down the needle track. An antihistamine preparation (a combination of pyrrobutamine 15 mg., phenylpyramine 25 mg., and cyclopentamine hydrochloride 12.5 mg. (Co-pyronil) (1963)) or chlorpheniramine (Piriton) 4 mg. (1964) was given orally 30